



RAJALAKSHMI ENGINEERING COLLEGE CURRICULUM AND SYLLABUS

B.E. COMPUTER SCIENCE AND DESIGN REGULATIONS 2023

Vision

To develop Innovative and highly Ethical Computer Science and Design Professionals through excellence in teaching, research and training.

Mission

- To produce globally competent professionals, motivated to learn the emerging technologies in Computer Science and Design and to be creative and innovative in solving real world problems.
- To promote research activities amongst the faculty and students that could benefit the society.
- To impart ethical values in their profession.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: To equip students with essential background in computer science and design, and applied mathematics by adopting best practices to meet the demands of academia, industry and media.

PEO 2: To prepare students with fundamental knowledge in programming languages, and tools and enable them to improve and develop applications.

PEO 3: To develop professionally ethical and socially responsible computer science and design professionals with enhanced analytical skills, communication skills, lifelong learning, creativity, innovation, organizing ability and leadership quality to meet industry requirements.

PROGRAMME OUTCOMES (POs)

PO1: Engineering knowledge: Apply the knowledge of Mathematics, Science, Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

A graduate of the Computer Science and Design Program will have

PSO 1: Strength in the foundations of programming languages and competence in computing technologies and tools to design and implement efficient software solutions using suitable algorithms, data structures and other computing techniques.

PSO 2: A Skill to Independently investigate problems which can be solved by a Human Computer Interaction (HCI) design process and design an end-to-end solution from user need identification to UI design to technical coding and evaluation. Ability to effectively use suitable tools and platforms, as well as enhance them, to design and develop applications/products in animation, gaming, augmented and virtual reality, etc.

PSO 3: An Ability to apply knowledge in various domains to identify research gaps and to provide solution to new ideas, inculcate passion towards higher studies, creating innovative career paths to be an entrepreneur and evolve as an ethically social responsible computer science and design professional.

CURRICULUM

B. E. COMPUTER SCIENCE AND DESIGN Regulation 2023 | Total Credits: 160

SEMESTER I								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.	HS23111	Technical Communication I	HS	2	2	0	0	2
2.	MA23113	Mathematics for Design	BS	4	3	1	0	4
3.	CD23111	Design Drawing and Sketching	PC	3	2	1	0	3
4.	GE23117	தமிழ்மரபு /Heritage of Tamils	HS	1	1	0	0	1
LAB ORIENTED THEORY COURSES								
5.	GE23131	Programing using C	ES	7	1	0	6	4
6.	PH23132	Physics for Information Science	BS	5	3	0	2	4
LABORATORY COURSE								
7.	GE23122	Engineering Practices – Electrical and Electronics	ES	2	0	0	2	1
MANDATORY COURSE								
8.	MC23111	Indian Constitution and Freedom Movement	MC	3	3	0	0	0
TOTAL				27	15	2	10	19

SEMESTER II								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.	MA23214	Probability and Inferential Statistics	BS	4	3	1	0	4
2.	CD23211	Foundation in Digital StoryTelling	PC	3	3	0	0	3
3.	GE23217	தமிழ்மரபும் தொழில்நுட்பமும் / Tamils and Technology	HS	1	1	0	0	1
LAB ORIENTED THEORY COURSES								
4.	CD23231	Visual Communication Foundations	PC	6	2	0	4	4
5.	IT23231	Digital Principles and Computer Architecture	PC	5	3	0	2	4
6.	CS23231	Data Structures	PC	7	3	0	4	5
LABORATORY COURSE								
7.	HS23221/HS23222	Technical Communication II / English for Professional Competence	HS	2	0	0	2	1
8.	GE23121	Engineering Practices – Civil and Mechanical	ES	2	0	0	2	1
MANDATORY COURSE								
9.	MC23112	Environmental Science and Engineering	MC	3	3	0	0	0
TOTAL				33	18	1	14	23

SEMESTER III								
Sl. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.	MA23313	Discrete Mathematics for AI	BS	4	3	1	0	4
LAB ORIENTED THEORY COURSES								
2.	CD23331	Design Processes and Perspectives	PC	5	3	0	2	4
3.	CS23331	Design and Analysis of Algorithms	PC	5	3	0	2	4
4.	CD23332	UI and UX design	PC	6	2	0	4	4
5.	CS23332	Database Management Systems	PC	7	3	0	4	5
LABORATORY COURSE								
6.	CD23321	Python Programming for Design	PC	6	0	0	6	3
TOTAL				33	14	1	18	24

SEMESTER IV								
Sl. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.		Open Elective-I	OE	3	3	0	0	3
LAB ORIENTED THEORY COURSES								
2.	MA23433	Mathematical Modelling and Simulation	BS	5	3	0	2	4
3.	AI23231	Principles of Artificial Intelligence	PC	5	3	0	2	4
4.	CS23432	Software Construction	PC	5	3	0	2	4
5.	CS23532	Computer Networks	PC	5	3	0	2	4
6.	CS23333	Object Oriented Programming using Java	PC	7	1	0	6	4
EMPLOYABILITY ENHANCEMENT COURSES								
7.	GE23421	Soft Skills – I	EEC	2	0	0	2	1
8.	CD23421	Industry Internship (2/4 weeks)	EEC	0	0	0	0	1
TOTAL				32	16	0	16	25

SEMESTER V								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.		Professional Elective-I	PE	3	3	0	0	3
LAB ORIENTED THEORY COURSES								
2.	CD23531	Animation and Graphics	PC	8	2	0	6	5
3.	CS23431	Operating Systems	PC	7	3	0	4	5
4.	CS23531	Web Programming	PC	5	1	0	4	3
5.	CD23532	Design Thinking for Innovation in Product Development	EEC	3	1	0	2	2
EMPLOYABILITY ENHANCEMENT COURSES								
6.	GE23521	Soft Skills – II	EEC	2	0	0	2	1
TOTAL				28	10	0	18	19

SEMESTER VI								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.		Open Elective – II	OE	3	3	0	0	3
2.		Professional Elective-II	PE	5	3	0	2	4
LAB ORIENTED THEORY COURSES								
3.	CD23631	Game Design and Development	PC	6	2	0	4	4
4.	AI23331	Fundamentals of Machine Learning	PC	5	3	0	2	4
LABORATORY COURSES								
5.	CD23621	Mobile Application Design and Development Laboratory	PC	4	0	0	4	2
6.	CD23622	Animated Educational Content/YouTube videos	EEC	6	0	0	6	3
EMPLOYABILITY ENHANCEMENT COURSES								
7.	GE23622	Problem Solving Techniques	EEC	2	0	0	2	1
TOTAL				31	11	0	20	21

SEMESTER VII								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
THEORY COURSES								
1.		Professional Elective-III	PE	3	3	0	0	3
2.		Professional Elective-IV	OE	5	3	0	2	4
LAB ORIENTED THEORY COURSES								
3.	CD23731	Film Making and Radio Podcasting	PC	4	2	0	2	3
LABORATORY COURSES								
4.	CD23721	Visual Effects	PC	6	0	0	6	3
5.	CD23722	Capstone Project Phase 1*	EEC	8	0	0	8	4
TOTAL				26	8	0	18	17

SEMESTER VIII								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1.		Professional Elective-V	PE	3	3	0	0	3
2.		Professional Elective-VI	PE	3	3	0	0	3
LABORATORY COURSES								
3.	CD23821	Capstone Project Phase 2*	EEC	12	0	0	12	6
TOTAL				18	6	0	12	12

*Should have focus on Design Aspects

TOTAL NO. OF CREDITS: 160

PROFESSIONAL ELECTIVES (PE)

Virtual and Augmented Reality								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1	CD23A31	Computer Graphics for Virtual Reality	PE	6	2	0	4	4
2	CD23A32	Fundamentals of Augmented Reality	PE	6	2	0	4	4
3	CD23A33	Fundamentals of Virtual Reality	PE	6	2	0	4	4
4	CD23A34	Multimedia Technologies	PE	6	2	0	4	4
5	CD23A35	Metaverse	PE	6	2	0	4	4
6	CD23A36	Virtual Health and Medicine	PE	6	2	0	4	4
7	CD23A37	Digital Video Production	PE	6	2	0	4	4

Program Specific Elective 1 (3 Credits)								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1	CD23B11	Aesthetics and Art	PE	4	2	1	0	3
2	CD23B12	Digital Media Entrepreneurship	PE	3	3	0	0	3
3	CD23B31	Digital Audio Design and Synthesis	PE	4	2	0	2	3
4	CD23B21	Data Visualization	PE	6	0	0	6	3
5	CS23633	Cloud Computing	PE	4	2	0	2	3
6	CD23B13	Interactive Marketing Fundamentals	PE	3	3	0	0	3
7	AI23B34	Human Computer Interaction	PE	4	2	0	2	3

Program Specific Elective 2 (4 Credits)

SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1	CD23A35	Metaverse	PE	6	2	0	4	4
2	CD23C31	Introduction to Motion Graphics	PE	6	2	0	4	4
3	CD23C32	3D Animation	PE	6	2	0	4	4
4	IT23531	Computer Vision	PE	5	3	0	2	4
5	CD23C33	Hadoop and Big Data Analytics	PE	5	3	0	2	4
6	AI23531	Deep Learning	PE	5	3	0	2	4
7	AI23632	Foundations of Natural Language Processing	PE	5	3	0	2	4

Emerging Technologies

SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1	CS23A32	Robotic Process Automation	PE	5	1	0	4	3
2.	CB23A12	Digital Marketing and Web Analytics	PE	3	3	0	0	3
3	CS23A36	3D Printing and Design	PE	4	2	0	2	3
4	IT23A31	Internet of Things	PE	4	2	0	2	3
5	CS23A33	Cyber security and Forensics	PE	4	2	0	2	3
6	CS23632	Cryptography and Network Security	PE	4	2	0	2	3
7	AI23B36	Cognitive Science	PE	4	2	0	2	3
8	CR23A33	Cryptocurrency and Blockchain Technologies	PE	4	2	0	2	3
9	AI23B32	Soft Computing	PE	4	2	0	2	3
10	IT23C18	Agile Methodologies	PE	3	3	0	0	3

Full Stack Development								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1	IT23431	Software Testing	PE	4	2	0	2	3
2	IT23B31	C# and .Net Programming	PE	4	2	0	2	3
3	IT23B32	Advanced Web Programming	PE	4	2	0	2	3
4	IT23B33	DevOps	PE	4	2	0	2	3
5	IT23B34	Advanced Java Programming	PE	4	2	0	2	3
6	CS23A35	Web Application Security	PE	4	2	0	2	3
7	IT23C12	Software Project Management	PE	3	3	0	0	3

Cyber Security								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1.	CR23A11	Security Assessment and Risk Analysis	PE	3	3	0	0	3
2.	CS23A11	Malware Detection and Analysis	PE	3	3	0	0	3
3.	CR23A31	Ethical Hacking and Security	PE	4	2	0	2	3
4.	CR23A32	Digital and Mobile Forensics	PE	4	2	0	2	3
5.	CR23A33	Cryptocurrency and Blockchain Technologies	PE	4	2	0	2	3
6.	CR23A34	Security and Privacy in Cloud	PE	4	2	0	2	3
7.	CR23A35	Social Network Security	PE	4	2	0	2	3
8.	CS23A35	Web Application Security	PE	4	2	0	2	3
9.	CR23A36	Information Security and Management	PE	4	2	0	2	3

Elective Courses offered by CSD

Open Electives								
1.	CD23O31	Visual Design and Communication	PC	4	2	0	2	3
2.	CD23O32	Game Programming	PC	4	2	0	2	3

SUMMARY OF ALL COURSES

B.E. COMPUTER SCIENCE AND DESIGN										
S.NO	Course Category	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	HS	3	2							5
2	BS	8	4	4	4					20
3	ES	5	1							6
4	PC	3	16	20	16	13	10	6		84
5	PE					3	4	7	6	20
6	OE				3		3			6
19	EEC				2	3	4	4	6	19
8	MC									0
	Total	19	23	24	25	19	21	17	12	160

Credit Distribution

Category	R2019	R2023
Humanities and Social Sciences including Management courses HS	9	5
Basic Science courses BS	27	20
Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. ES	17	6
Professional core courses PC	74	84
Professional Elective courses PE	18	20
Open Electives from other technical and /or emerging subjects OE	6	6
Project work, seminar and internship in industry or elsewhere EEC	14	19
Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Knowledge Tradition] MC	0	0
Total	165	160

Students are permitted to do the following activities in their due course, after successful completion, students can drop any one professional /Open elective course (Max 3 credits)

Guidelines for Special Projects / Activities for AIML, AIDS and CSD

S.no	Description	Credits	To be Completed	Compulsory	Optional	Professional or Open Elective can be dropped in
1	GE23527 Research Paper L T P C : 0 0 2 1	1	on or before VI Semester		AIML, AIDS & CSD	Additional credits or combine with other online courses eligible drop in VII or VIII Semester
2	CD23622 Games/Short Film/ Animation Videos/ Animated Educational Content L T P C : 0 0 6 3	3	on or before VI Semester	CSD	AIML & AIDS	Not applicable for CSD, but for others in VII or VIII Sem (3 - credits Course only)
3	GE23428 Interdisciplinary Societal Project / Real World Web & Mobile Applications/ Innovative Product L T P C : 0 0 6 3	3	on or before VI Semester		AIML , AIDS &CSD	VII or VIII Sem (3 - credits Course only)
4	GE23429 Participation in National /International competitions L T P C : 0 0 6 3	3	on or before VI Semester		AIML , AIDS &CSD	VII or VIII Sem (3 - credits Course only)

GE23527 Research Paper writing (Eligible to drop 1 credit course Professional / Open elective course (if any) or combined with other online courses, eligible to drop one Professional/Open Elective (Max 3 credits) in VII or VIII semester)	L T P C : 0 0 2 1
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Research Paper –

Guideline Activities:

- Individual work
- Each student has to identify the domain area
- Select any 5 conferences/Journal papers to understand their work (published within 5 years)
- Write a research paper on comparative study on the following topics
 - Aim of the paper
 - Problem statement identified
 - Methodology to solve the problem
 - Tools used to solve the problem
 - Result of the problem
 - Identify the error or defect in the result
 - Identify the future work / enhancement of this result
- **Assessment:**
- The **Research Paper writing** shall be evaluated for a maximum of 100 marks, as a Continuous Assessment
- A guide will be assigned to each student to monitor the progress and conduct the review meetings.
- Finally, student has to submit the research paper on comparative study
- The viva-voce examination will be conducted with external faculty member from other/same department(s)

Continuous Assessment 100 Marks		
Review I	Review II	Viva-Voce
Guide	Guide	External (from other department)
30	30	40

Evaluation - To be given as a Rubric – some components

- Introduction/Topic - introduction grabs interest of reader and states topic. Thesis/topic clear, well-developed, and a definitive statement.
- Topic Focus –The topic is focused narrowly enough for the scope of this assignment. A thesis statement provides direction for the paper, either by statement of a position or hypothesis.
- Content - Balanced presentation of relevant and legitimate information that clearly supports a central purpose or argument and shows a thoughtful, in-depth analysis of a significant topic. Concepts are integrated into the writer’s own insights.

- Depth of Discussion - In-depth discussion & elaboration in all sections of the paper. Sources support the thesis argument in a logical manner. References are correctly cited.
- Evaluation and Results – Appropriate evaluation Measure & Results Comparison with existing work
- Conclusion -Summary of thesis argument with concluding ideas that impact reader. Introduces no new information
- Review Presentations
- Writing - Writing is clear and relevant, with no grammatical and/or spelling errors – polished and professional. Reference, citations and images are properly formatted.
- Length - Paper is the not more than 10 pages specified in the assignment.
- References–(at least 7) Quality -Sources include both general background sources and specialized sources. All web sites utilized are authoritative.

CATEGORY	Obtained	9-10 points	7-8 points	4-6 points	0-3 points
Introduction/Topic					
Topic Focus					
Content					
Depth of Discussion					
Evaluation and Results					
Conclusion					
Review Presentations					
Writing					
Length					
References					
Total:					

Passing Requirements:

- The student should secure 50% marks in Continuous Assessment to pass in the subject
- If a student fails in this course he/she has to redo this course in subsequent semesters.

GE23427 Games/Short Film/ Animation Videos / Animated Educational Content (Eligible to drop one Professional/Open Elective(Max 3-credits) in VII or VIII semester)	L T P C : 0 0 6 3
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Activities:

- Team Size : Maximum 2 students
- Team has to identify the problem statement of game/ Educational video content / short film/ Animated video
- Committee (consist of Project coordinator, Faculty member and guide) has to approve the team proposal to proceed further
- Team has to develop GAME/Video
- Team has to submit the report

Assessment:

- The **Game/Short Film/ Animation Videos /Animated Educational Content** shall be evaluated for a maximum of 100 marks, as a Continuous Assessment
- A guide will be assigned to each team to monitor the progress and conduct the review meetings.
- Finally, each student in the team has to submit the project report
- The viva-voce examination will be conducted with external faculty members from other/same department
- Based on the quality of the project, committee can approve to publish in YouTube.

Continuous Assessment 100 Marks		
Review I	Review II	Viva-Voce
Guide	Guide	External (from other department)
30	30	40

Passing Requirements:

- The student should secure 50% marks in Continuous Assessment to pass in the subject
- For CSD students, this course is compulsory, in such a case , If a student fails in this course he/she has to redo this course in subsequent semesters
- For branch students, on successful completion of this project work, students are eligible to drop one Professional o/Open Elective (Max. 3 credits) in VII or VIII Semesters

GE23428 Interdisciplinary Societal Project / Real World Web or Mobile Applications / Innovative Product (Eligible to drop one Professional/Open Elective(Max 3-Credits) in VII or VIII semester)	L T P C : 0 0 6 3
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Activities:

- Team Size : Maximum 2 students
- Team has to identify the problem statement to solve
- Committee (consist of a Project coordinator, a Faculty member and a guide) has to approve the team proposal to proceed further
- Team has to develop a project
- Team has to submit the Project report
 - **Assessment:**
- The **Project work** shall be evaluated for a maximum of 100 marks, as a Continuous Assessment
- A guide will be assigned to each team to monitor the progress and conduct the review meetings.
- Finally, each student in the team has to submit the project report
- The viva-voce examination will be conducted with external faculty members from other/same department
- Based on the quality of the project, committee can approve to publish in YouTube.

Continuous Assessment 100 Marks		
Review I	Review II	Viva-Voce
Guide	Guide	External (from other department)
30	30	40

Passing Requirements:

- The student should secure 50% marks in Continuous Assessment to pass in the subject
- on successful completion of the project work, students are eligible to drop one Professional or Open Electives (3 credits) in VII or VIII Semesters

GE23429 Participation in National /International competitions (Eligible to drop one Professional/Open Elective (Max 3-credits) in VII or VIII semester)	L T P C 0 0 6 3
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Activities:

- Team Size : Maximum 3 students
- Team has to identify National / International level competition
- Based on the problem statement GUIDE will be assigned
- Committee (consist of Project coordinator, Faculty member and guide) has to approve the proposal of the team to proceed further
- Team has to prepare and participate in the competition
- Team has to submit the final report

- **Assessment:**

- Committee (consist of Project coordinator, Faculty member and guide) has to evaluate the report and should conduct viva-voce examination

Viva-Voce
50 Marks

Passing Requirements:

- The student should secure 50% marks in the Viva-voce examination
- Eligible students can drop one Professional or Open Elective (Max. 3 credits) in VII or VIII Semesters

AR/VR as Minor degree for other branches**Total Credits: 18**

Virtual and Augmented Reality								
SI. NO.	COURSE CODE	COURSE TITLE	Category	Contact Periods	L	T	P	C
1	CD23A31	Computer Graphics for Virtual Reality	PE	6	2	0	4	4
2	CD23A32	Fundamentals of Augmented Reality	PE	6	2	0	4	4
3	CD23A33	Fundamentals of Virtual Reality	PE	6	2	0	4	4
4	CD23A34	Multimedia Technologies	PE	6	2	0	4	4
5	CD23332	UI and UX design	PC	6	2	0	4	4
6	CD23A37	Digital Video Production	PE	6	2	0	4	4

CSD Hons –Choose

1 Course from Programme Specific Elective 1(4 Credit)

- 4 Credits

2 Courses from Programme Specific Elective 2 (3 Credit)

- 6 Credits - (2x3= 6 Credits)

3 Courses from General Elective

- 9 Credits– (3x3 =9 Credits)

Total Credits: 19

Subject Code	Subject Name (Theory course)	Category	L	T	P	C
HS 23111	Technical Communication I	HS	2	0	0	2
Common to all branches of B.E/B. Tech programmes – First Semester						

Objectives:
To facilitate students develop their comprehension skills
To enable students to improve their receptive skills
To equip learners with better vocabulary and enhance their writing skills
To aid students speak effectively in all kinds of communicative contexts.
To improve the learners' basic proficiency in workplace communication

UNIT-I	DEVELOPING COMPREHENSION SKILLS	6
<p>Listening: Introduction to Informational listening – Listening to Podcasts, News</p> <p>Reading: Intentional Reading - Short Narratives and Passages.</p> <p>Speaking: Introducing Oneself, Narrating a Story / Incident.</p> <p>Writing: Sequential Writing – connecting ideas using transitional words (Jumbled Sentences), Process Description</p> <p>Grammar: Verbs –Main& Auxiliary: Simple Tenses – Form, Function and Meaning.</p> <p>Vocabulary: Word formation – Prefix, Suffix, Compound Words.</p>		
UNIT-II	LISTENING AND EXTENDED READING	6
<p>Listening: Deep Listening – Listening to Talk Shows and Debates</p> <p>Reading: In-depth Reading - Scanning Passages</p> <p>Speaking: Describing Current Issues, Happenings, etc.,</p> <p>Writing: Note Making, Note Taking – Paragraph Writing</p> <p>Grammar: Continuous Tenses, Prepositions, Articles</p> <p>Vocabulary:One Word Substitutes, Phrasal Verbs.</p>		
UNIT-III	FORMAL WRITING AND VERBAL ABILITY	6

Listening: Listening to Lectures and Taking Notes

Reading: Interpretation of Tables, Charts and Graphs

Speaking:SWOT Analysis on Oneself

Writing:Formal Letter Writing and Email Writing

Grammar:Perfect Tenses, Phrases and Clauses, Discourse Markers

Vocabulary :Verbal Analogy / Cloze Exercise

UNIT-IV	ENHANCING SPEAKING ABILITY	6
<p>Listening:Listening to eminent voices of one’s interest (Martin Luther King, APJ Abdul Kalam, etc..)</p> <p>Reading:Timed Reading, Filling KWL</p> <p>Chart. Speaking:Just a Minute, Impromptu</p> <p>Writing:Check-list, Instructions.</p> <p>Grammar:‘Wh’Questions / ‘Yes’ or ‘No’Questions, Imperatives</p> <p>Vocabulary:Synonyms, Antonyms, Different forms of the same words.</p>		
UNIT-V	LANGUAGE FOR WORKPLACE	6
<p>Listening: Extensive Listening (Audiobooks, rendering of poems, etc.)</p> <p>Reading: Extensive reading (Jigsaw Reading, Short Stories, Novels)</p> <p>Speaking: Short Presentationson Technical Topics</p> <p>Writing:Recommendations,Essay Writing</p> <p>Grammar:Impersonal Passive, Reported Speech,Concord</p> <p>Vocabulary :Informal Vocabulary and Formal Substitutes</p>		
		Total Contact Hours: 30

Course Outcomes:
On completion of the course students will be able to
apply their comprehension skills and interpret different contents effortlessly
read and comprehend various texts and audio visual contents
infer data from graphs and charts and communicate it efficiently in varied contexts
participate effectively in diverse speaking situations
to present, discuss and coordinate with their peers in workplace using their language skills

<p>SUGGESTED ACTIVITIES</p> <p>Ice breaker Just A Minute Ship wreck Hot seat Vocabulary building Chinese whispers Case study</p>

<p>SUGGESTED EVALUATION METHODS</p>
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Assignment topics Quizzes Class Presentation/Discussion Continuous Assessment Tests
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Text Book(s):

- | |
|---|
| 1. Effective Technical Communication by M. Ashraf Rizvi (Author) 2nd Edition Paperback 2017 |
| 2. Sylvan Barnet and Hugo Bedau, 'Critical Thinking Reading and Writing', Bedford/st. Martin's: Fifth Edition (June 28, 2004) |
| 3. MeenakshiUpadhyay, Arun Sharma – Verbal Ability and Reading Comprehension. |
| 4. Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine ChuenMengGoh, Cambridge University Press |

Reference Books(s) / Web links:
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- | |
|--|
| 1. Basic Vocabulary in Use: 60 Units of Vocabulary Practice in North American English With Answers 2nd Edition by Michael McCarthy (Author), Felicity O'Dell (Author), John D. Bunting (Contributor) |
| 2. Reading Development and Difficulties By Kate Cain |
| 3. The 7 Habits of Highly Effective People by Stephen Covey, Simon and Schuster, UK |
| 4. Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content Hardcover by Ann Handley (Author) |

Course Code	Course Title	Category	L	T	P	C
MA23113	MATHEMATICS FOR DESIGN	BS	3	1	0	4

Objectives:
<ul style="list-style-type: none"> To express various matrix techniques and to illustrate the nature of the matrix.
<ul style="list-style-type: none"> To gather the matrix algebra techniques and the concepts of basis and dimension in vector spaces.
<ul style="list-style-type: none"> To formulate and analyze complex engineering problems using the concepts of Geometric algebra.
<ul style="list-style-type: none"> To explain techniques of calculus which are applied in the Engineering problems.
<ul style="list-style-type: none"> To apply the techniques of Integration in finding area and volumes.

UNIT-I	MATRICES AND QUADRATIC FORMS	12
Matrices : Types - Symmetric and Skew – symmetric matrices, Hermitian matrix, Unitary matrix and Orthogonal matrices – Rank, Inverse and Trace of a matrix - Eigen values and eigenvectors- Diagonalization of matrices using orthogonal transformation -Quadratic forms-Reduction to canonical form using orthogonal transformation.		
UNIT-II	VECTOR SPACES	12
Vector spaces – Subspaces – Linear combinations and system of Linear equations – Linear independence and Linear dependence – Bases and Dimensions – Linear Transformation – Matrix representation of Linear Transformation - Null space, Range space and dimension theorem (without proof).		
UNIT-III	GEOMETRIC ALGEBRA	12
Two dimensional objects: Straight lines, Circles, Polygons -Three dimensional objects : Prisms, Cones, Cylinders, Spheres, Torus- Coordinate System :Cartesian and polar -Vectors: Scalar products and Vector products- Quaternion : arithmetic, quaternion as matrix- Transformation in plane- Rotation, Translation and Reflections- Introduction to parametric curves in planes.		
UNIT-IV	FUNCTIONS OF SEVERAL VARIABLES	12
Partial differentiation–Total derivative–Change of variables–Jacobians–Partial differentiation of implicit functions– Taylor’s series for functions of two variables–Maxima and minima of functions of two variables–Lagrange’s method of undetermined multipliers.		
UNIT-V	MULTIPLE INTEGRALS	12
Double integrals–Change of order of integration–Area enclosed by plane curves–Triple integrals–Volume of solids– Numerical computation of double integrals-Trapezoidal rule.		
Total Contact Hours: 60		

Course Outcomes:
On completion of the course students will be able to
<ul style="list-style-type: none"> Demonstrate various matrix techniques in solving the related problems in engineering and technology.
<ul style="list-style-type: none"> Apply the concepts of basis and dimension in vector spaces to the solution of related complex engineering problems.
<ul style="list-style-type: none"> Formulate and analyze complex engineering problems using the concepts of Geometric algebra.
<ul style="list-style-type: none"> Interpret the problems in Engineering and Technology using the principles of mathematical calculus.
<ul style="list-style-type: none"> Evaluate multiple integrals to conduct investigations of complex problems.

SUGGESTED ACTIVITIES

Problem solving sessions (will be explain through online calculator)

SUGGESTED EVALUATION METHODS

Problem solving in Tutorial sessions
Assignment problems
Quizzes and class test
Discussion in classroom

Text Book(s):

1.	Grewal B.S., “ Higher Engineering Mathematics ”, Khanna Publishers, New Delhi, 43rd Edition, 2014.
2.	Introduction to linear algebra, 5th Edition, Gilbert Strang, 2016. Wellesley Publishers.
3.	John Vince., “ Geometric algebra for computer graphics” Springer.

Reference Books(s) / Web links:

1.	Friedberg, A.H., Insel, A.J. and Spence, L., Elementary Linear Algebra, a matrix approach, 2 nd edition, Pearson, 2014.
2.	Erwin Kreyszig , " Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3.	Bali, N.P. and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 2006.
4.	T Veerarajan, Engineering Mathematics –I , McGraw Hill Education, 2018.
5.	Ramana. B.V., " Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.

Subject Code	Subject Name (Theory Course)	Category	L	T	P	C
CD23111	DESIGN DRAWING AND SKETCHING	PC	2	1	0	3
Objectives:						
•	To enable drawing as a medium for observing, representing, conceptualizing, visualizing and communicating design ideas.					
•	To develop an understanding of spatial concepts and the critical ability to think and visualize in three dimensions through the tactile nature of drawing.					
•	To develop observational skills through the study of the environment and as a tool for visual representation, ideation/conceptualization, visualization and communication or presentation of design ideas through sketching and drawing from both observation and memory.					

UNIT-I	INTRODUCTION TO DESIGN DRAWING	9
Introduction to Materials, Tools & Methods - different grades of pencils & exploring- Developing free finger, wrist, hand & arm movement and initiate muscle- Introduction to Observation – Scrutinize, Examine, Study, Inspect, Perceive, Sense, Feel, Notice, Identify, Understand- Training the eye to observe accurately to educate the visual sense- Introduction to Perception – View, Opinion, Insight, Discernment- Introduction to Perspective – Eye level, Vanishing Point		
UNIT-II	DRAWING OF CUBES and PERSPECTIVES	9
Introduction to Vanishing Points, View Point, Eye Level, Horizon, Parallel & Converging Lines-One Point Perspective- Two Point Perspective-Three Point Perspective-Perspective in the Environment, Interior Spaces and Objects.		
UNIT-III	OBJECT DRAWING and HUMAN FORM DRAWING	9
Introduction to other geometric forms like cylinder, cuboids etc. - Introduction to Object Drawing-How to observe – shape, proportions, effect of light on the objects etc.- Introduction to Human Form Proportions-Human Form – Object Relationships		
UNIT-IV	GEOMETRY & STRUCTURE	9
Construction of Basic Polygons-Proportioning Systems: Golden Proportion- Interrelation of Polygons- Orthographic Projection of Planes and Solids-. Isometric Projection-Architectonic Drawing - Isometric Circles-Architectonic Planes with rounded surfaces, tube with square cross section with ellipse at different planes and tube with circular cross- section.		
UNIT-V	VISUALISATION DRAWING	9
Introduction to Mental Imagery- Compositions inclusive of human forms, object, perspective etc- Sketching a mini environment outside the campus from memory- Sketching a visualized composition from imagination		
Total Contact Hours		: 45
Course Outcomes: On completion of the course students will be able to		
•	Develop the skill & ability to observe and visually represent all the elements in their environment with a focus on human forms, objects and nature and the way they interact.	
•	inculcate skills and develop the ability to explain the importance of precision in design through drawings using instruments/tools and concept of figures/configuration through basic geometrical patterns on 2D surfaces.	
•	Develop the ability to discuss orthographic and isometric projections as fundamental tools of technical drawing and use technical drawings as a tool for visual communication.	
•	Develop the ability to analyse visual structure of 3D forms on 2D surfaces with an exposure to the complexities of imagination and visualization.	
•	Develop the ability to analyse complex images and in turn develop the ability to create mental imageries and visualise concepts.	

SUGGESTED ACTIVITIES (if any) (UNIT/ Module Wise) – Could suggest topic

- Character Sketching
- Sketch from Memory
- Digital Art Creation
- Live Sketching
- Story Board Development

SUGGESTED EVALUATION METHODS (if any) (UNIT/ Module Wise) – could suggest topic

Use of Various level of pencils

Quality of Drawing

Picture Perfect

Similarity of Script

Text Book(s):

1	Erik Olofsson, Klara Sjolen, Design Sketching, KEEOS Design Books, 2005.
2	K . Morling, Geometric and Engineering Drawing, Third Edition, Graduate of the Institution of Mechanical Engineers, SI Units, Elsevier, 2010.
3	Brom, Sketching from the Imagination: An Insight into Creative Drawing, 3dtotal publishing, 2013.
4	Flint, Tom, Anatomy for the Artist: The Dynamic of the Human Form, London, Arcturus Publishing, 2017.

Reference Books(s):

1	Koos Eissen, Roselien Steur, Sketching: The Basics, BIS Publishers, 2014.
2	Edwards, Betty, drawing on the Artist Within: An Inspirational and Practical Guide to Increasing Your Creative Powers, Simon & Schuster Inc., New York, 1987.

அலகு I மமொழி மற்றும் இலக்கியம் :

3

இந்திய தமொழிக்குடும் பங் கள் - திரொவிடதமொழிகள் - தமிழ் ஒரு தெம் தமொழி - தமிழ் தெவ் விலக்கியங் கள் - ஂங் க இலக்கியத்தின் ெமய ெொரபற்ற தன் மம - ஂங் க இலக்கிய த்தில் பகிரதல

அறம் - திருக்குறளில் மமலொண் மமக் கருத்Fக்கள் - தமிழிக் கொப்பியங் கள் , தமிழகத்தில் ெமண

தபௌத்த ெமயங் களின் ள் மற்றும் நொயன் மொரக ள் -

தொக்கம் - பக்தி

இலக்கியம் , ஆழ்வொரக

சிறுலக்கியங் கள் -

- தமிழ் இலக்கிய வளரெசி யில

தமிழில் நவீன

இலக்கியத்தின் வளரெசி

பொரதியொர் மற்றும்

பொரதிதொண்

ஆகிமயொரின் பங் களிப்பு.

அலகு II மரபு - பொற்ற ஓவியங் கள் முதல் நவீன ஓவியங் கள் வறர - சிற்பக் கறல:

3

நடுகல் முதல் நவீன சிற்பங் கள் வமர - ஐம் தபொன் சிமலகள் - பழங் குடியினர் மற்றும் அவரகள் தயொரிக்கும் மகவிமனப் தபொருட்கள் , தபொம் மமகள் - மதர் தெய் யும் கமல - சுடுமண் சிற்பங் கள் - நொட்டுப்புறத் ததய் வங் கள் - குமரிமுமனயில்

திருவள்ளுவர் சிமல - இமெக் கருவிகள்

மிருதங் கம் , பமற, வீமண, யொழ் ,

ளின் ெமுக தபொருளொதொர வொழ் வில

நொதஸ் வரம் - தமிழரக மகொவில் களின்

பங் கு.

அலகு III நொட்டுப்புறக் கறலகள் மற்றும் வீர விறளயொட்டுகள் :

3

ததருக்கூத்F, கரகொட்டம் , வில் லுப்பொட்டு, கணியொன் கூத்F, ஓயிலொட்டம் , மதொல் பொமவக் கூத்F,

சிலம் பொட்டம் , வளரி,

ளின் விமளயொட்டு

கள் .

புலியொட்டம் , தமிழரக

அலகு IV

தமிழர்களின் திறைக் ககொட்பொடுகள் :

3

தமிழகத்தின் தொவரங் களும் , விலங் குகளும் - ததொல் கொப்பியம் மற்றும் ஂங் க இலக்கியத்தில் அகம

மற்றும் புறக் மகொட்பொடுகள் - தமிழரகள் மபொற்றிய அறகம் கொட்பொடு - ஂங் ககொலத்தில் தமிழத்தில்

எழுத்தறிவும் , கல் வியும் - ஂங் ககொல நகரங் களும் Fமற முகங் களும் - ஂங் ககொலத்தில் ஏற்றுமதி

மற்றும் இறக்குமதி - கடல் கடந்த நொடுகளில் மொழரகளின் தவற்றி.

அலகு V இந்திய கதசிய இயக்கம் மற்றும் இந்திய பைப் பொட்டிற்குத் தமிழர்களின் பங்களிப்பு:

3

இந்திய விடுதலம்மபொரில் தமிழர்களின் பங்கு - இந்தியொவின் பிறப்பகுதிகளில் தமிழ் ப் பண் பொட்டின் தொக்கம் - சுயமரியொமத இயக்கம் - இந்திய மருத்வத்தில் , சித்த மருத்வத்தின பங்கு - கல் தவட்டுகள் , மகதயமுத்ஃப்படிகள் - வரலொறு. தமிழ் ப் புத்தகங் களின் ஁சு

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலொறு - மக்களும் பண் பொடும் - மக.மக. பிள்மள (தவளியீடு: தமிழ் ஁நாடு பொடநூல் மற்றும் கல் வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முமனவர் இல. சுந்தரம் . (விகடன் பிரசுரம்).
3. கீழடி - மவமக நதிக்கமரயில் ஁ங் ககொல நகர ஁நாகரிகம் (ததொல் லியல் Fமற தவளியீடு)
4. தபொருமந - ஆற்றங் கமர ஁நாகரிகம் . (ததொல் லியல் Fமற தவளியீடு)
5. Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu)(Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr. S. V. Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Subject Code	Subject Name	Category	L	T	P	C
GE23131	PROGRAMMING USING C	ES	1	0	6	4
Common to						

Objectives:

- To develop simple algorithms for arithmetic and logical problems.
- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions , pointers and structures
- To develop applications using structures and union

List of Experiments

1. Overview of C, Constants, Variables and Data Types
2. Operators and Expressions, Managing Input and Output Operations
3. Decision Making and Branching
4. Decision Making and Looping
5. Nested Loops - while and for, Jumps in Loops
6. One-Dimensional Arrays
7. Searching Algorithms - Linear and Binary
8. Sorting Algorithms - Bubble and Selection
9. Two-Dimensional and Multi-dimensional Arrays
10. Character Arrays and Strings Handling Functions
11. User-Defined Functions - Recursive Functions
12. Passing Arrays and Strings to Functions
13. Scope, Visibility and Lifetime of Variables
14. Structures and Unions
15. Pointers
16. The Preprocessor

Platform Needed: GCC Compiler for Windows/Linux

Total Contact Hours: 90

Text Book(s):

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Second Edition, PHI
2. Byron Gottfried, "Programming in C", Second Edition, Schaum Outline Series

Reference Books(s) / Web links:

- Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill.
- Yashavant Kanetkar, "Let Us C", BPB Publications
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
- NPTEL course , "Problem Solving Through Programming In C", By Prof. Anupam Basu, IIT Kharagpur

Course Outcomes:

On completion of the course, the students will be able to

- Formulate simple algorithms for arithmetic and logical problems.
- Implement conditional branching, iteration and recursion.
- Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- Use arrays, pointers and structures to formulate algorithms and programs.
- Apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

Suggested Activities

Practice small and tricky codes
 Practice problems in portals like Digital Café
 Debugging the codes
 Completing the function definitions etc

CO - PO – PSO matrices of course**CO - PO – PSO matrices of course**

PO/PSO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
GE19141.1	1	2	2	2	1	-	-	-	1	2	1	1	2	3	-
GE19141.2	1	1	1	1	1	-	-	-	-	-	1	1	2	2	-
GE19141.3	1	1	2	1	1	-	-	-	-	-	1	1	2	2	-
GE19141.4	2	2	3	2	1	-	-	-	1	-	2	1	2	2	2
GE19141.5	2	2	3	2	1	-	-	-	-	-	2	1	2	2	2
Average	1.4	1.6	2.2	1.6	1.0	-	-	-	1.0	2.0	1.4	1.0	2.0	2.2	2.0

Correlation levels 1, 2 or 3 are as defined below:

1: Slight (Low) 2: Moderate (Medium) 3:

Substantial (High) No correlation: “-“

Subject Code	Subject Name	Category	L	T	P	C	
PH23132	PHYSICS FOR INFORMATION SCIENCE For Common to -B.E.-CSE, CSD, Cyber Security &B.Tech.- IT, AIML,	BS	3	0	2	4	
Objectives:							
•	To understand the principles of laser and fiber optics in engineering and technology.						
•	To analyze the properties of magnetic and superconducting materials.						
•	To understand the advanced concept of quantum theory and applications.						
•	To become proficient in semiconductor applications						
•	To become proficient in optoelectronic devices						
UNIT-I	LASERS AND FIBER OPTICS					9	
Lasers: Characteristics, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) –Nd-YAG Laser, Semiconductor lasers: Homojunction and Heterojunction- Applications of Lasers. Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, mode and refractive index) – losses associated with optical fibers -Fiber optic communication system - fiber optic sensors: pressure and displacement.							
UNIT-II	MAGNETIC AND SUPERCONDUCTING MATERIALS					9	
Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility -Magnetic material classification: diamagnetism – paramagnetism – ferromagnetism – antiferromagnetism – ferrimagnetism – Domain Theory- M versus H behaviour – Hard and soft magnetic materials – examples and uses– Magnetic principle in computer data storage. Superconductors: Properties - BCS theory (Qualitative)- Type-I and Type II superconductors - Magnetic levitation-SQUID-Cryotron.							
UNIT-III	QUANTUM PHYSICS					9	
Introduction- Quantum free electron theory-De Broglie's concept-Schrodinger wave equation-Time independent and time dependent equations-Physical significance of wave function - Particle in a one dimensional box – electrons in metals -degenerate states – Fermi- Dirac statistics – Density of energy states -Size dependence of Fermi energy – Quantum confinement – Quantum wells, Quantum wires, Quantum dots and Quantum clusters - Band gap of nanomaterials.							
UNIT-IV	SEMICONDUCTOR PHYSICS					9	
Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – Band gap determination- extrinsic semiconductors (Qualitative)-Hall effect -determination of Hall co-efficient-Formation of P-N junction-Forward bias- Reverse bias -Ohmic contact-Schottky diode- Tunnel diode.							
UNIT-V	OPTOELECTRONICS					9	
Classification of optical materials – carrier generation and recombination processes – Absorption, emission and scattering of light in metals, insulators and semiconductors (concepts only) – Photo electric effect-Photo current in a P-N diode – Photo transistor-solar cell - LED – Organic LED- Non Linear Optical materials-properties and applications.							
					Contact Hours	:	45

List of Experiments			
1	Determine the wavelength of the laser using grating and size of the particle using diode laser.		
2	Determine the numerical aperture and acceptance angle of optical fiber.		
3	Study the permeability of the free space using Helmholtz coil.		
4	Determine the hysteresis loss in the transformer core using B-H curve unit.		
5	Determine the band gap of given semiconductor.		
6	Determine the Hall coefficient of semiconducting material.		
7	Determine specific resistance of the material of given wires using metre bridge.		
8	Study the resonance frequency in series connected LCR circuits.		
9	Determine the V-I characteristics of the solar cell.		
10	Determine the thickness of the given specimen by using air wedge method.		
			Contact Hours
			: 30
			Total Contact Hours
			: 75
Course Outcomes:			
On completion of the course, the students will be able to			
•	Use the concepts of Laser and Fiber optics in communication.		
•	Use the properties of magnetic and superconducting materials in data storage devices.		
•	Apply the concepts of electron transport in nanodevices.		
•	Analyse the physics of semiconductor devices		
•	Analyze the properties of optical materials for optoelectronic applications.		
Suggested Activities			
•	Problem solving sessions		
Suggested Evaluation Methods			
•	Quizzes		
•	Class Presentation / Discussion		
Text Book(s):			
1	Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.		
2	Jasprit Singh, "Semiconductor Devices: Basic Principles", Wiley 2012.		
3	Kasap, S.O. "Principles of Electronic Materials and Devices", McGraw-Hill Education, 2007.		
Reference Books(s) / Web links:			
1	S. O. Pillai, Solid state physics, New Age International, 2015.		
2	Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.		
3	Hanson, G.W. "Fundamentals of Nanoelectronics". Pearson Education, 2009.		

List of Equipment Available
(Common to B.E. CSD and CSE & B.Tech. AI&DS, AI & ML, IT)

S. No	Name of the equipment	Quantity Required	Quantity Available	Deficiency
1	Wavelength of Laser and Characteristics -Laser source and grating plate	7	15	-
2	Laser - angle of divergence and NA acceptance angle	6	8	-
3	Determination of permeability of free space - Helmholtz coil setup	5	5	-
4	B-H curve Setup and CRO	6	7	-
5	Band gap of a semiconductor Setup	6	19	-
6	Hall coefficient of Semiconductor Setup	4	4	-
7	Determine specific resistance of the material of given wires-metre bridge	6	6	-
8	LCR circuit kit	6	7	-
9	Solar cell parameters setup	6	8	-
10	Thickness of thin wire-Air wedge method-Travelling Microscope, Glass Plate	8	13	-

CO - PO – PSO matrices of course

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	2	2	1	-	-	-	-	-	2	1	1	1
CO 2	3	3	2	2	3	1	1	-	-	-	-	2	1	1	1
CO 3	3	3	2	2	3	1	1	-	-	-	-	2	2	1	1
CO 4	3	3	2	2	3	1	1	-	-	-	-	2	2	1	1
CO 5	3	3	2	2	3	1	1	-	-	-	-	2	2	1	1
Average	3.00	3.00	2.00	2.00	2.80	1.00	0.00	0.00	0.00	0.00	0.00	2.00	1.80	1.00	1.00

1: Slight (Low) 2: Moderate (Medium)

3: Substantial (High) If there is no correlation, put “-”

Subject Code	Subject Name	Category	L	T	P	C	
GE23122	ENGINEERING PRACTICES - ELECTRICAL AND ELECTRONICS	ES	0	0	2	1	
Objectives:							
•	To provide hands-on experience on various basic engineering practices in Electrical Engineering.						
•	To provide hands-on experience on various basic engineering practices in Electronics Engineering.						
List of Experiments							
A. ELECTRICAL ENGINEERING PRACTICE							
1	Residential house wiring using switches, fuses, indicators, lamp and energy meter.						
2	Fluorescent lamp wiring.						
3	Stair case wiring.						
4	Measurement of electrical quantities – voltage, current, power & power factor in RL circuit.						
5	Measurement of earth resistance using Megger.						
6	Study of Ceiling Fan and Iron Box						
B. ELECTRONICS ENGINEERING PRACTICE							
1	Study of electronic components and equipment – Resistor, colour coding, measurement of AC signal parameters (peak-peak, rms period, frequency) using CRO/DSO.						
2	(a) Measurement of electrical quantities using Multimeter (b) Testing of electronic components.						
3	Study of logic gates : AND, OR, EXOR and NOT.						
4	Generation of Clock Signals.						
5	Soldering practice – Components Devices and Circuits – Using general purpose PCB.						
6	Measurement of ripple factor of Half-wave and Full-wave Rectifiers.						
					Total Contact Hours	:	30
Course Outcomes:							
On completion of the course, the students will be able to							
•	fabricate the basic electrical circuits						
•	implement the house wiring circuits						
•	fabricate the electronic circuits						
•	verify the truth table of logic gates						
•	design the Half-wave and Full-wave Rectifiers using diodes and passive components						
SUGGESTED EVALUATION METHODS							

- Experiment based Viva

REFERENCE	
1	Bawa H.S., “Workshop Practice”, Tata McGraw – Hill Publishing Company Limited, 2007.
2	Jeyachandran K., Natarajan S. & Balasubramanian S., “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.
3	Jeyapoovan T., Saravanapandian M. & Pranitha S., “Engineering Practices Lab Manual”, Vikas Publishing House Pvt.Ltd, 2006.
4	Rajendra Prasad A. & Sarma P.M.M.S., “Workshop Practice”, SreeSai Publication, 2002.

Lab Equipment Required:

S.	Name of the Equipment	Quantity Required
1	Residential house wiring using switches, fuse, indicator, lamp and energy	3Nos
2	Fluorescent lamp wiring.	3 Nos
3	Stair case wiring	3 Nos
4	Measurement of electrical quantities – voltage, current, power & power	2 Nos
5	Study purpose items: Iron box, Ceiling fan.	2 each
6	Megger (250V/500V)	2 Nos.
7	Soldering guns	10 Nos.
8	Assorted electronic components for making circuits	50 Nos.
9	Small PCBs	10 Nos.
10	Multimeters	10 Nos.
11	Digital trainer kit	5 Nos.
12	CRO	8 Nos.
13	Transformer	8 Nos.
14	Function Generator	8 Nos.

CO - PO – PSO matrices of course

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	3	3	2	-	-	2	-	3	2	-	3			
CO 2	3	3	2	2	-	-	2	-	3	2	-	3			
CO 3	3	3	3	2	-	-	2	-	3	2	-	3			
CO 4	3	3	3	2	-	-		-	3	2	-	3			
CO 5	3	3	3	2	-	-		-	3	2	-	3			
Average	3	3	2.67	2	-	-	2	-	3	2	-	3			

Subject Code	Subject Name (Theory course)	Category	L	T	P	C
MC23111	Indian Constitution and Freedom Movement	Theory	3	0	0	0
Common to all branches of B.E/B. Tech Programmes – First / Second/third Semester						

Objectives:
<ul style="list-style-type: none"> To apprehend the sacrifices made by the freedom fighters.
<ul style="list-style-type: none"> To inculcate the values enshrined in the Indian constitution.
<ul style="list-style-type: none"> To instil a sense of responsibility as the citizens of India.
<ul style="list-style-type: none"> To familiarise about the functions of the various levels of Government.
<ul style="list-style-type: none"> To be informed about Constitutional and Non- Constitutional bodies.

UNIT-I	INDIAN FREEDOM MOVEMENT	9
British Colonialism in India-Colonial administration till 1857- Revolt of 1857- Early Resistance to British Rule-Rise of Nationalism in India-Indian Freedom Struggle under Mahatma Gandhi-Non- Cooperation Movement-Civil Disobedience Movement- Quit India Movement-British Official response to National movement- Independence of India Act 1947-Freedom and Partition.		
UNIT-II	CONSTITUTION OF INDIA	9
Historical Background – Indian Constitution: Constitution’ meaning of the term, Sources and constitutional history, Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.		
UNIT-III	STRUCTURE AND FUNCTIONS OF CENTRAL GOVERNMENT	9
Union Government – Structure of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.		
UNIT-IV	STRUCTURE AND FUNCTION OF STATE GOVERNMENT AND LOCAL BODY	9
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts- Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati Raj: Introduction, Elected officials and their roles, Village level: Role of Elected and Appointed officials.		
UNIT-V	CONSTITUTIONAL FUNCTIONS AND BODIES	9
Indian Federal System – Centre – State Relations – President’s Rule – Constitutional Functionaries – Assessment of working of the Parliamentary System in India- CAG, Election Commission, UPSC, GST Council and other Constitutional bodies-. NITI Aayog, Lokpal, National Development Council and other Non –Constitutional bodies.		
Total Contact Hours: 45		

Course Outcomes: Upon completion of the course, students will be able to:
<ul style="list-style-type: none"> appreciate the sacrifices made by freedom fighters during freedom movement.
<ul style="list-style-type: none"> be responsible citizens and abide by the rules of the Indian constitution.
<ul style="list-style-type: none"> be aware of the functions of the Indian government.
<ul style="list-style-type: none"> be knowledgeable about the functions of the state Government and the Local bodies.
<ul style="list-style-type: none"> apply the knowledge on constitutional functions and role of constitutional bodies and non-constitutional bodies.

SUGGESTED ACTIVITIES

Famous speeches from around the world relating to independence
Case study

Quiz on Portfolio and Cabinet
Discussions on International Associations like the UN, BRICS, QUAD
Presentation on issues around the world

SUGGESTED EVALUATION METHODS

Assignment topics
Quizzes
Class Presentation/Discussion

Continuous assessments (CAT)

Text Book(s):

1. M. Laxmikanth , “Indian Polity:, McGraw-Hill, New Delhi.
2. Durga Das Basu, “Introduction to the Constitution of India “, Lexis Nexis, New Delhi. 21sted 2013.
3. P K Agarwal and K N Chaturvedi ,PrabhatPrakashan, New Delhi, 1sted , 2017.

Reference Books(s) / Web links:

1. Sharma, Brij Kishore, “Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, “Indian Political System “, New Academic Publishing House, Jalaendhar
3. Bipan Chandra, India’s Struggle for Independence, Penguin Books, 2016.
4. Maciver and Page, “Society: An Introduction Analysis “, Mac Milan India Ltd., New Delhi.2nded, 2014.
5. Bipan Chandra, History of Modern India, Orient Black Swan, 2009.

Course Code	Course Title	Category	L	T	P	C
MA23214	PROBABILITY AND INFERENCE STATISTICS	BS	3	1	0	4
Common to II Sem. B.E.– CSD and B.Tech. - AI&DS and AI&ML						

Objectives:
<ul style="list-style-type: none"> To analyse data pertaining to discrete and continuous variables and to interpret the results in the given situation.
<ul style="list-style-type: none"> To explain the data that we are interested by using hypothesis testing and to draw conclusions about the population using sample data.
<ul style="list-style-type: none"> To identify the strength and direction of a linear relationship between two variables and using regression and correlation to predict dependency for data-driven decisions regarding our processes.
<ul style="list-style-type: none"> To Characterize, compare, and contrast different nonparametric hypothesis tests.
<ul style="list-style-type: none"> To Model time series to analyses the underlying structure(s) in both the time and frequency domains.

UNIT-I	PROBABILITY - BAYES THEOREM	12
Probability models and axioms- Conditioning and Bayes' rule – Discrete random variables: Binomial and Poisson distributions - Multiple discrete random variables: joint PMFs, expectations, conditioning- Continuous random variables: Uniform and Gaussian distributions - Multiple continuous random variables- Continuous Bayes rule.		
UNIT-II	STATISTICAL TESTING	12
Bayesian statistical inference-Maximal Likelihood estimation: Parameters of Binomial and Poisson distribution- Test of significance – Z test: Single mean, difference of means -Chi square - F test.		
UNIT-III	LINEAR STATISTICAL MODELS	12
Scatter diagram- Linear Regression and Correlation- Least squares method- Rank correlation- Multiple regression and multiple correlation- Analysis of variance (one way, two way).		
UNIT-IV	NON PARAMETRIC TESTS	12
Sign test -Wilcoxon signed rank test - Mann Whitney test - Run test - Kolmogorov Smirnov test - Spearman and Kendall's test - Tolerance region.		
UNIT-V	BASICS OF TIME SERIES	12
Stationary Time Series - ARIMA models: Identification, Estimation and Forecasting.		
Total Contact Hours: 60		

Course Outcomes:
On completion of the course students will be able to
<ul style="list-style-type: none"> Apply the basic concepts of probability and random variables in complex engineering problems.
<ul style="list-style-type: none"> Obtain statistical data from experiments and to analyze the same using statistical test to conduct investigations of complex problems in engineering.
<ul style="list-style-type: none"> Use the concepts of regression and correlation in real life problems such as predict trends and adjust product and services or advertising and marketing campaigns. That is,analyze complex engineering problems reaching substantiated conclusions.
<ul style="list-style-type: none"> Formulate, test and interpret various nonparametric tests for problems in engineering and technology. That is, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<ul style="list-style-type: none"> Run and interpret time series models and regression models and reaching substantiated conclusions in relevant engineering problems using time series.

SUGGESTED ACTIVITIES
Problem solving sessions
MATLAB and GeoGebra
Time series forecasting using R program

SUGGESTED EVALUATION METHODS

Problem solving in Tutorial sessions
Assignment problems
Quizzes and class test
Discussion in classroom

Text Book(s):

1.	T. Veerarajan, 'Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks', McGraw Hill, 2016.
2.	Goon, M. Gupta and B. Dasgupta, "Fundamentals of Statistics", Vol. I & II, A., World Press.
3.	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
4.	John F. Shortle, James M. Thompson, Donald Gross, Carl M. Harris, "Fundamentals of Queueing Theory", Wiley series in Probability and Statistics, 5 th edition, 2018.

Reference Books(s) / Web links:

1.	S.M. Ross, "A first course in Probability", Prentice Hall, 8 th edition, 2010.
2.	R. Johnson, "Miller & Freund's Probability and Statistics for Engineers", (9 th Edition), PHI.
3.	Trivedi.K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", John Wiley and Sons, 2016.
4.	Chris Chatfield, "The analysis of Time series: An Introduction".

Subject Code	Subject Name (Theory Course)	Category	L	T	P	C
CD23211	Foundation in Digital Story Telling	PC	3	0	0	3

Objectives:

- To learn writing and structuring story for different genres and why a script should be written in a particular format
- To consider the relationship between what is being communicated to target audience/viewer.
- To analyze and explore forms of communication and media through a variety of design disciplines and techniques
- To develop theoretical and practical knowledge of a range of media using problem- finding skills, culminating in design and production of a finished piece of work.
- To understand the various stages to a professional workflow.

UNIT-I	INTRODUCTION TO STORY TELLING	9
Introduction to storytelling –Types of stories – discussion of convention storytelling – Genre - Elements of Story - Theme & Plot, One line story, Story with a Message, Arch, Anti & Mini Plot - Story, storyline, plot, and treatment - Principles of suspense and surprise		
UNIT-II	STORY TELLING AND FILM LANGUAGE	9
Role of Drama in Story Telling - Storytelling through Camera - Storytelling through Editing - Storytelling through use of Sound & Music - Storytelling in Cinema - Basics of film language: Sequence, Scene, shot, Frame, Types of shots, Camera angles, Camera movements, Editing, Continuity, Composition - The art of staging - Mis-en-scene.		
UNIT-III	IDEATION AND CREATIVITY	9
The ideation and creativity in binding a story - How to turn a small idea into a full story? - Carving well-rounded characters for a script - Write a synopsis for your screenplay - Build your synopsis into an outline - Screenwriting: 3 Act Structure - Setup, Confrontation and Resolution; Hero's Journey - Different stages of Hero's Journey; Conflict & Cliché - Elements of Screenwriting - Foreshadowing, Flash Back, Time Travel; Rise & Fall and Climax & Resolution - Managing Conflicts.		
UNIT-IV	CREATING A STORY	9
Creating Compelling Characters - Using Archetypes to Flesh Out Character - The Hero's Journey - Creating Treatments that Sell - Developing the Perfect Beginning and Ending - Making Your Theme Resonate - Crafting Dialogue that Rings True - Creating Action that Packs a Punch - Controlling Pacing.		
UNIT-V	SCREENPLAY AND PITCHING	9
Screenplay Formatting - Formats and adaptation of a screenplay - Designing the Perfect Logline - Online Resources for Screenwriters - Art of reading a script - Understanding Script dynamics - Most used software's for writing the screenplay - Pitching your story to the production houses in few minutes - Marketing Your Screenplay.		
Total Contact Hours:		45

Course Outcomes:

- Effectively utilize relevant technical concepts and theories.
- Analyze and evaluate methods of communication and appropriateness of media within a specialist area and describe basic skills.
- Layout and present a script in a professional manner.
- Develop an idea into a workable story.
- Critique scripts, diagnose problems and find solutions.

Text Books(s):

1	Field, Syd, "Selling Screenplay: The Screenwriter's Guide to Hollywood", New York, Dell Publishing, 1989.
2	Field, Syd, "Selling Screenplay: The Screenwriter's Guide to Hollywood", New York, Dell Publishing, 1989.
3	Meyer, William, "Screen Writing for narrative film and TV", Collumbus Books, London, (1989).
4	Rib Davis, "Writing Dialogue for Scripts", Bloomsbury Academic, 2016.
5	Robert McKee, "Story: Style, Structure, Substance, and the Principles of Screenwriting", It Books; 1 edition, 1997.

Reference Books(s):

1	Wood, Julia T, "Communication mosaics: An introduction to the field of Communication", 2001, Wards worth.
2	Emory A Griffin, "A first look at communication theory", 3rd edition, New York: McGraw-Hill, 1997.
3	Griffin, Em, "A First Look at Communication Theory", New York: McGraw-Hill, 2006.
4	Miller, K., "Communication Theories: Perspectives, processes, and contexts", 2nd edition, New York: McGraw-Hill, 2005.
5	Umberto Eco, "A Theory of Semiotics", Indiana University Press, 1975.

Weblink(s):

1	https://www.masterclass.com/articles/how-to-tell-a-story-effectively
2	https://www.inc.com/paul-jarvis/the-5-common-elements-of-good-storytelling.html
3	https://hbr.org/2003/06/storytelling-that-moves-people

CO -PO–PSO matrices of course

PO/PSO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CD19P03.1	0	1	2	2	2	3	1	1	1	2	1	3	0	1	3
CD19P03.2	0	1	2	2	2	3	1	1	1	2	1	3	0	1	3
CD19P03.3	0	1	2	2	2	3	1	3	1	2	1	3	0	1	3
CD19P03.4	0	1	2	2	2	3	1	1	1	2	1	3	0	3	3
CD19P03.5	0	1	2	2	3	3	1	1	1	2	1	3	0	3	3
Average	0	1	2	2	2.2	3	1	1.4	1	2	1	3	0	1.8	3

Correlation levels 1,2 or 3 are as defined below:

1:Slight (Low)

2:Moderate(Medium)3:Substantial

(High)No correlation:“-”

அலகு I

மநசவு மற்றும் பொறனத் மதொழில் நுட்பம் : 3

ெங் க கொலத்தில் தநெவுத் ததொழில் - பொமனத் ததொழில் நுட்பம் - கருப்பு சிவப்பு பொண் டங் கள் -
பண் டங் களில் கீறல் குறியீடுகள் .

அலகு II

வடிவறமப்பு மற்றும் கட்டிடத் மதொழில் நுட்பம் : 3

ெங் க கொலத்தில் வடிவமமப்பு மற்றும் கட்டுமொனங் கள் & ெங் க கொலத்தில்
வீட்டுத்தபொருட்களில்
வடிவமமப்பு - ெங் க கொலத்தில் கட்டுமொன தபொருட்களும் நடுகல் லும் - சிலப்பதிகொரத்தில்
மமமட
அமமப்பு பற்றிய விவரங் கள் - மொமல் லபுரெ் சிற்பங் களும் , மகொவில் களும் - மொழர்
கொலத்Fப்
தபருங் மகொயில் கள் மற்றும் பிற வழிபொடடுத் தலங் கள் - நொயக்கர் கொலக் மகொயில் கள் -
மொதிரி
கட்டமமப்புகள் பற்றி அறிதல் , மFமர மீனொட்சி அம் மன் ஆலயம் மற்றும் திருமமல
நொயக்கர மஹொல் - தெட்டிநொடு வீடுகள் - பிரிட்டிஷ் கொலத்தில் தென் மனயில்
இந்மதொ - ெொமரொதெனிக் கட்டிடக் கமல.

அலகு III

உற்பத்தித்

மதொழில் நுட்பம் :

3

கப்பல் கட்டும் கமல - உமலொகவியல் - இரும் புத் ததொழிற்ெொமல - இரும் மப
உருக்குதல் , எஃகு - வரலொற்றுெ் ெொன் றுகளொக தெம் பு மற்றும் தங் க நொணயங் கள் -
நொணயங் கள் ெௌெடித்தல் - மணி உருவொக்கும் ததொழிற்ெொமலகள் - கல் மணிகள் ,
கண் ணொடி மணிகள் - சுடுமண் மணிகள் - ெங் கு மணிகள் - எலும் புத்Fண் டுகள் -
ததொல் லியல் ெொன் றுகள் - சிலப்பதிகொரத்தில் மணிகளின் வமககள் .

அலகு IV

கவளொண் றம்

மற்றும் நீ ர்ப்பொசனத் மதொழில் நுட்பம் :

3

அமண, ஏரி, குளங் கள் , மதகு - மொழரகொலக் குழுழித் ாம் பின் முககியத்Fவ் ம் -
கொல் நமட
பரொமரிப்பு - கல் நமடகளுக்கொக வடிவமமக்கப்பட்ட கிணறுகள் - மவளொண் மம மற்றும்
மவளொண் மமெ் ெொரந்த தெயல் பொடுகள் - கடல் ெொர் அறிவு- மீன்
வளம் - முத்F மற்றும்
முத்Fக்குளித்தல் - தபருங் கடல் குறித்த பண் மடய அறிவு - அறிவுெொர் ெமுகம் .

அலகு V

அறிவியல் தமிழ்

மற்றும் கைத்தமிழ் :

3

அறிவியல் தமிழின் - கணித்தமிழ் வளரெசி - தமிழ் நூல் கமள மின் பதிப்பு
வளரெசி தெய் தல் -
தமிழ் தமன் தபொருட்கள் உருவொக்கம் - தமிழ் இமணயக் கல் விக்கழகம் - தமிழ் மின் நூலகம்
-
இமணயத்தில் தமிழ் அகரொதிகள் - தொற்குமவத் திட்டம் .

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண் பொடும் - மக.மக. பிள்மள (தவளியீடு: தமிழ் நொடு பொடநூல் மற்றும் கல் வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முமனவர் இல. சுந்தரம் . (விகடன் பிரசுரம்).
3. கீழடி - மவமக நதிக்கமரயில் ெங் ககொல நகர நொகரிகம் (ததொல் லியல் Fமற தவளியீடு)
4. தபொருமந - ஆற்றங் கமர நொகரிகம் . (ததொல் லியல் Fமற தவளியீடு)
5. Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu)(Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr. S. V. Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Subject Code	Subject Name(Lab Oriented Theory Course)	Category	L	T	P	C
CD23231	Visual Communication Foundations	PC	2	0	4	4

Objectives:	
•	To understand the principles of the visual language and their semantic use. A multi- disciplinary domain, design consists of, aesthetics, architecture, products, communication, processes, systems, technology, business/commerce, ramification on environment and society and demands.
•	To communicate more concisely and in a visually appropriate manner, it is necessary to use commonly understood principles, perspective and design layout standards.
•	To understand the fundamentals of Typography and Photography.

UNIT-I	INTRODUCTION TO VISUAL DESIGN	6
Importance of understanding visual language-its relation in context to nature and environment-Exploring and understanding Dots, Lines, Forms, Space, Pattern, Texture and Color as an element of visual language		
UNIT-II	INTRODUCTION TO THE PRINCIPLES OF VISUAL LANGUAGE	6
Visual explorations and experiments with Form, Color, and Space, Texture, in relation to the context and environments – Concepts of harmony, balance, contrast, proportion, order, symmetry, asymmetry, rhythm, tension, juxtaposition, proximity, size, scale, proportion, orientation, alignment, variety, gradation, dominance, subordination, transition etc.		
UNIT-III	INTRODUCTION TO FUNDAMENTALS OF TYPOGRAPHY	6
Introduction to Type and its History-Type as a form and means of communication in our environment-Introduction to Indian type: Vernacular letter-forms-Classification of types: Typefaces, type families and type designers-Anatomy of the type: x-height, ascenders, descenders, counter, cap-height, baseline, etc-Typographic variables: Kerning, tracking, leading, spacing etc.-Semantics of type: Legibility & readability.		
UNIT-IV	INTRODUCTION TO PHOTOGRAPHY	6
Introduction and Orientation: Art and Science of Photography. Drawing out parallels / differences between the EYE and the CAMERA-Camera: Understanding the various controls on a Digital SLR Camera Features and Details. Shooting Modes. Aperture and Depth of Field. Shutter Speed. Critical Shutter Speeds and Effects- Exposure: Exposure as function of Quantity of Light and Time. Getting used to shooting in Manual Mode and learning to measure light using the camera's built-in exposure meter-Film Speed/Sensor Sensitivity: Understanding the role of sensitivity in Exposure. ISO/ASA and Digital Noise-Lenses: Different Types of Lenses. Classification of Lenses by Focal Lengths. Angle of View. Fixed Focal Length and Zoom Lenses. Close up and Macro Lenses-Light and Color Temperature- Digital Post-Production: Introduction to File-Formats. RAW vs.JPG. Understanding resolution, resizing and basic image post processing using Photoshop. Exploring the software to visualize and create digital mosaics.		
UNIT-V	INTRODUCTION TO VIDEOGRAPY	6
Concept development- Storyboarding-Video Shooting - Framing, Camera movement etc., Video Editing Defining communication-Sender, Channel and Receiver-Semiotics - Study of sign process (semiosis), meaning making and meaningful communication. Sign, Signifier, Signified-Denotation and Connotation- Story, narrative and see different perspectives- Identifying problems, opportunities and improvements. Differentiating problem, need and conflict-Persona study-Scenario study.		
Total Contact Hours		: 30

List of Experiments

1	Design an object using Points, Lines, Planes and Textures and their relationships in context to nature and environment.
2	Design a digital environment in context to nature using Forms, Spaces and Patterns.
3	Sketch a character using various colours, colour harmonies and colour wheel.
4	Design a new Type Face.
5	Design a Poster by exploring different type faces, colours, textures and patterns.
6	Design a new infographic for displaying percentage of results.

7	Explore different types of cameras, lenses and list out the variations between them.
8	Design an album of pictures by differentiating various ISO levels, exposure, shutter speed and white balance.
9	Design a composition of pictures with a relationship between each picture.
10	Edit the pictures from the composition using various tools in photoshop.
11	Develop a storyboard by Identifying Theme/Subject/Topic/Story/Pont of View & Research.
12	Shoot and edit a video sequence using storyboard, framing and camera movement.
Course Outcomes:	
On completion of the course students will be able to	
•	Develop the ability to create visual compositions using basic elements and by applying appropriate principles of visual composition to communicate
•	Develop the ability to perceive, visualize, and communicate visual elements as visual narratives
•	Develop the ability to apply the dynamics of visual design in Typography and Photography.
•	Develop the ability to address simple communication problems through a visualization process and construct mental imageries
•	Demonstrate the ability to plan, develop, design and execute communication products
SUGGESTED ACTIVITIES	
<ul style="list-style-type: none"> ○ Design Patterns and Brushes ○ Design a New Font family ○ Capture photos using golden rule ○ Develop a short clip 	
SUGGESTED EVALUATION METHODS	
<ul style="list-style-type: none"> • Use of Appropriate lens • Design of Fonts using Proper Scale • Narration of Script • Quality of Videos 	

Text Books(s):	
1	Wallschlaeger, Charles, & Busic-Synder, Cynthia, Basic Visual Concepts and Principles for Artists, Architects and Designers, McGraw-Hill, (2010).
2	Blain Brown, Cinematography: Theory and Practice: Image Making for Cinematographers and Directors, A Focus Press Book, 2016
3	Paul McNeil, The Visual History of Type, Laurence King Publishing. 2017

Reference Books:	
1	Buxton, Bill, Sketching User Experience: Getting the Design Right and the Right Design (Interactive Technologies), Morgan Kaufmann, (2007).
2	Caplin, Steve; Banks, Adam, The Complete Guide to Digital Illustration, Publisher: Watson - Guptill Publications, (2003).

Subject Code	Subject Name (Theory course)	Category	L	T	P	C
IT23231	Digital Principles and Computer Architecture	PC	3	0	2	4
Common to	AIML, AIDS, CSD					

Objectives:
To introduce basic postulates of Boolean algebra and the methods for simplifying Boolean expressions. To introduce Logic Gates and implementation of logic function using logic gates
To outline the formal procedures for the analysis and design of combinational and sequential circuits
To learn the basic structure and operation of digital computer.
To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations
To expose and make the students to learn about the memory system design and different ways of communicating with I/O devices and standard I/O interfaces.

UNIT-I	MINIMIZATION TECHNIQUES	9
Number System and Complements: Number System - Boolean postulates and Laws – De-Morgan’s Theorem – Principle of Duality – Boolean Expression – Minimization of Boolean expressions -Sum of Products (SOP) – Product of Sums (POS). Minimization Techniques: Minimization of Boolean expressions using Boolean laws - Karnaugh map - Don’t care conditions. Logic Gates : Basic Logic Gates- Universal Gates.		
UNIT-II	COMBINATIONAL AND SEQUENTIAL CIRCUITS	9
Combinational Circuits : Adder - Subtractor –Multiplexer- De multiplexer – Decoder – Encoder. Sequential Circuits: Latches – Flip Flops – Shift Registers – Counters : Ripple – Synchronous Counter		
UNIT-III	INTRODUCTION TO COMPUTER ARCHITECTURE & INSTRUCTIONS	9
Introduction: Eight Great ideas in Computer Architecture – Components of a computer system – Technology for building processor and memory – Performance – Power wall. Instructions: Operations of Computer Hardware – Operands of Computer Hardware - Representing instructions in Computer - Logical operations – Instructions for decision.		
UNIT-IV	ARITHMETIC AND LOGIC UNIT	9
Design of ALU, Integer Arithmetic: Addition, Subtraction, Multiplication and Division – Floating Point Arithmetic: Representation, Addition, subtraction, Multiplication.		
UNIT-V	MEMORY AND I/O SYSTEMS	9
Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory – TLBs, Input/output system, programmed I/O, DMA and interrupts, I/O processors. Case Study: RAID		
		Total Contact Hours: 45

Description of the Experiments	Total Contact Hours: 30
1. Design and Implementation Basic Logic Gates – AND, OR and NOT	
2. Design and Implementation Universal Gates – NAND and NOR	
3. Design and Implementation of Half Adder using logic gates	
4. Design and Implementation of Full Adder using logic gates	
5. Design and Implementation of Half Subtractor using logic gates	
6. Design and Implementation of Full Subtractor using logic gates	
7. Design and Implementation of Multiplexer using logic gates.	
8. Design of Registers	

9. Design of Counters
10. Design of ALU
Total Contact Hours: 75

Course Outcomes: On completion of the course, the students will be able to
<ul style="list-style-type: none"> • Simplify the Boolean expressions using basic postulates of Boolean algebra with suitable minimization techniques. Understand the use of electronic circuits involved in the design of logic gates. • Apply the procedure to design and implement combinational and sequential circuits. • Understand the impact of instruction set architecture on cost-performance of computer design. • Perform computer arithmetic operations. • Evaluate the performance of memory systems.

SUGGESTED ACTIVITIES
<ul style="list-style-type: none"> • Problem Based Learning • Flipped classroom • Circuit Design using Simulator • Conceptual Online Quiz

SUGGESTED EVALUATION METHODS
<ul style="list-style-type: none"> • Continuous Assessment Test • Online Quiz Assignments • Offline Assignments • Experiment based VIVA

Text Book(s):
1. M. Morris Mano, Michael D. Ciletti “Digital Design”, 6 th Edition, Pearson, Prentice Hall, August 2018.
2. David A. Patterson and John L. Hennessey, “Computer organization and design”, Fifth edition, Elsevier, 2014.

Reference Books(s) / Web links:
Charles H.Roth, “Fundamentals of Logic Design”, 7th Edition, Thomson Learning, 2014.
Thomas L. Floyd, “Digital Fundamentals”, 10th Edition, Pearson Education Inc, 2011.
Charles H.Roth. “Fundamentals of Logic Design”, 6th Edition, Thomson Learning, 2013.
Donald D.Givone, “Digital Principles and Design”, TMH, 2003.
Vincent P. Heuring, Harry F. Jordan, “Computer System Architecture”, 2nd Edition, Pearson Education,2005.
Govindarajalu, “Computer Architecture and Organization, Design Principles and Applications”, 1st edition, Tata McGraw Hill, New Delhi, 2005.
John P Hayes, “Computer Architecture and Organization”,3rd edition, McGraw Hill, 2002.
V.CarlHamacher, Zvonko G. Varanescic and Safat G. Zaky, “Computer Organisation”, 6th edition, Mc Graw-Hill Inc, 2012.
William Stallings, “Computer Organization and Architecture Designing for performance”, 10th Edition, PHI Pvt. Ltd., Eastern Economy Edition 2016

Web Links for Virtual Lab (If any)
http://vlabs.iitkgp.ernet.in/coa/

<https://www.vlab.co.in/broad-area-computer-science-and-engineering>
<https://cse11-iiith.vlabs.ac.in/>

CO - PO – PSO matrices of course

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12	PS O1	PS O2	PS O3
CO 1	3	3	3	-	-	-	-	-	-	-	-	-	2	2	-
CO 2	3	2	3	-	-	-	-	-	-	-	-	-	2	1	2
CO 3	2	2	1	1	-	1	-	-	-	-	-	-	2	2	2
CO 4	3	3	1	2	-	-	-	-	2	-	1	-	2	2	2
CO 5	2	2	3	1	2	2	2	-	-	-	2	-	2	-	-
Average	2.6	2.4	2.2	1.33	2	1.5	2	-	2	-	1.5	-	2	1.75	2

Correlation levels 1, 2 or 3 are as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) No correlation: “-“

Subject Code	Subject Name (Lab Oriented Theory Course)	Category	L	T	P	C
CS23231	Data Structures	PC	3	0	4	5

Objectives:	
•	To apply the concepts of Linked List in the applications of various linear data structures.
•	To demonstrate the understanding of stacks, queues and their applications.
•	To apply the concepts of Linked List in the applications of various nonlinear data structures.
•	To understand the implementation of graphs and their applications.
•	To be able to incorporate various sorting and hashing techniques in real time scenarios

UNIT-I	Linear Data Structure –List	9
Self-Referential Structures, Dynamic Memory Allocation, Linked list implementation - Singly Linked List, Doubly Linked List, Circular Linked List, Applications of List.		
UNIT-II	Linear Data Structure –Stack and Queue	8
Stack – Operations, Array and Linked list implementation, Applications – Evaluation of Arithmetic Expressions, Queues- Operations, Array and Linked list Implementation.		
UNIT-III	NonLinear Data Structure –Trees	10
Tree Terminologies, Binary Tree Representation, Tree Traversals, Binary Search Trees, Binary Heap, Height Balance Trees – AVL Trees.		
UNIT-IV	NonLinear Data Structure –Graph	9
Representation of Graphs, Topological Sort, Depth First Search and Breadth-First Search , Minimum Spanning Tree – Prim's Algorithm, Shortest path algorithm – Dijkstra's Algorithm.		
UNIT-V	Sorting and Hashing	9
Sorting Techniques –Insertion Sort, Quick Sort, Merge Sort, Hashing- Hashing functions – Mid square, Division, Folding, Collision Resolution Techniques – Separate Chaining – Open Addressing – Rehashing.		
Contact Hours		45

Course Outcomes:	
On completion of the course, the students will be able to	
•	Understand and apply the various concepts of Linear data Structures
•	Understand and apply the various concepts of Non Linear data Structures.
•	Understand and apply the various sorting and Hashing concepts.
•	Analyse and apply the suitable data structure for their research.
•	Choose efficient data structures and apply them to solve real world problems.

SUGGESTED ACTIVITIES

- **Role play**- Linked List (**Unit 1**).
- **Mind Map, Poster Design** - Stack and Queue (**Unit 2**).
- **Flipped Classroom** - Binary Heap (**Unit 3**).
- **Poster Design** - Graph (**Unit4**).
- **Implementation of small module**- Hashing (**Unit5**).

SUGGESTED EVALUATION METHODS

- **Assignment problems** - Linked List (**Unit 1**).
- **Tutorial problems** - Applications – Evaluation of Arithmetic Expressions (**Unit 2**).
- **Quizzes** - BST and Binary Heap (**Unit 3**).
- **Tutorial problems**- Graph traversal (**Unit 4**).
- **Quizzes - Hashing and Sorting**(**Unit5**) .

Text Books(s):

1	“Data Structures and Algorithm Analysis in C”, Mark Allen Weiss, 2nd Edition, Pearson Education, 2005
2	“Data Structures and Algorithm Analysis in C++ - Anna University, Mark Allen Weiss, Pearson Education, 2017.

Reference Books:

1	“Data Structures Using C and C++”, Langsam, Augenstein and Tanenbaum, 2nd Edition, Pearson Education, 2015.
2	Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms”, Fourth Edition, Mcgraw Hill/ MIT Press, 2022.

Description of Experiments (If applicable)		60
1	Implementation of Single Linked List (Insertion , Deletion and Display).	
2	Implementation of Doubly Linked List (Insertion , Deletion and Display).	
3	Implementation of Stack using Array and Linked List implementation.	
4	Implementation of Queue using Array and Linked List implementation.	
5	Implementation of Binary Search Tree and perform Tree Traversal Techniques.	
6	Program to perform Quick Sort	
7	Program to perform Merge Sort	
8	Program to perform Linear Probing.	
9	Program to perform Rehashing.	
10	Mini Project: Contact book application using Linked List. Dictionary using Binary search trees. Snake Game. Chess Game. Travel Planner (Shortest Path Algorithm). Tic-Tac-Toe Game. Library Management System. Project Management System. other projects .	

Web links for Theory & Lab	
1	Data Structures - GeeksforGeeks
2	Data Structures DS Tutorial - javatpoint
3	Data Structure and Types (programiz.com)

CO - PO – PSO matrices of course

PO/PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CS19241.1	1	2	1	2	1	-	-	-	-	-	-	1	1	2	-
CS19241.2	1	1	2	1	1	-	-	-	-	-	-	2	2	2	-
CS19241.3	1	1	2	1	1	-	-	-	-	-	-	2	2	2	-
CS19241.4	1	1	2	1	1	-	-	-	-	-	-	2	2	2	-
CS19241.5	1	1	2	1	1	-	-	-	-	-	-	1	1	2	-
Average	1.0	1.2	1.8	1.2	1.0	-	-	-	-	-	-	1.6	1.6	2.0	-

Correlation levels 1, 2 or 3 are as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) No correlation: “-“

Subject Code	Subject Name (Theory course)	Category	L	T	P	C
HS 23222	Technical Communication II	HS	0	0	2	1
	Common to all branches of B.E/B. Tech programmes –Second Semester					

Objectives:
<ul style="list-style-type: none"> To facilitate students to improve their vocabulary for a better communication To enable learners to understand and reproduce language To aid students to write technical reports in a convincing manner To expose students to different sentence structures To equip learners to present their ideas in an efficient manner

UNIT-I	VOCABULARY FOR BETTER COMMUNICATION	6
<p>Listening:Telephonic Conversations and TV News</p> <p>Reading:Newspapers and Magazines</p> <p>Speaking: Conversational Practice: Speaking in a given situation, Asking permission and requesting etc.,</p> <p>Writing:Job Application Letter and Resume</p> <p>Grammar:Reference words: pronouns and determiners</p> <p>Vocabulary:Guessing meanings of words in different contexts.</p>		
UNIT-II	FUNCTIONAL LANGUAGE ASPECTS	6
<p>Listening:Motivational listening – listening to real life challenges</p> <p>Reading: Articles and Technical reports</p> <p>Speaking:Using Polite Expressions, Indirect Questions</p> <p>Writing:Paraphrasing a Text, Poem</p> <p>Grammar: Purpose Statements, Cause and Effect Expressions</p> <p>Vocabulary:Neologisms.</p>		
UNIT-III	TECHNICAL REPORTWRITING	6
<p>Listening:Empathetic Listening – Giving Solutions to Problems</p> <p>Reading: Inferential Reading</p> <p>Speaking: Dialogues – Interviewing Celebrities / Leaders / Sportspersons, etc.,</p>		

Writing: Report Writing		
Grammar: Functional Usage of Expressions – used to, gone / been, etc.,		
Vocabulary: Words Often Confused		
UNIT-IV	STRUCTURAL GRAMMAR	6
Listening: Comprehension (IELTS practice tests)		
Reading: Intensive Reading for specific information		
Speaking: Pick and Talk		
Writing: Proposals		
Grammar: Sentence Structures – Simple, Compound, Complex Sentences		
Vocabulary: Replacing dull words with vivid ones		
UNIT-V	PRESENTATION SKILLS	6
Listening: Discriminative listening – sarcasm, irony, pun, etc.,		
Reading: Practice of chunking – breaking up reading materials		
Speaking: Mini presentation on some topic		
Writing: Minutes of the meeting		
Grammar: Correction of Errors		
Vocabulary: Advanced vocabulary – fixing appropriate words in the given context.		
Total Contact Hours: 30		

Course Outcomes:
On completion of the course students will be able to
<ul style="list-style-type: none"> ● communicate effectively using appropriate vocabulary ● use the acquired language skills to comprehend various types of language contents ● evaluate different texts and write effective technical content ● use appropriate sentence structures to convey their thoughts in varied contexts ● present their concepts and ideas in an effective manner

SUGGESTED ACTIVITIES
<p>Story Lines One truth and two lies Hang Man Pictionary Word Scramble Case study</p>

SUGGESTED EVALUATION METHODS

Assignment topics
Quizzes
Class Presentation/Discussion
Continuous Assessment Tests

Text Book(s):

8. Raymond Murphy, "Intermediate English Grammar," Second Edition , Cambridge University Press, 2018
9. Meenakshi Raman & Sangeeta Sharma, "Technical Communication" Third Edition, Oxford University Press, 2015
10. Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine ChuenMengGoh, Cambridge University Press

Reference Books(s) / Web links:

1. Michael McCarthy (Author), Felicity O'Dell (Author), John D. Bunting (Contributor), "Basic Vocabulary in Use: 60 Units of Vocabulary Practice in North American English With Answers" 2nd Edition
2. Dale Carnegie, "The Art of Public Speaking," Insight Press
3. Jack C. Richards & Theodore S. Rodgers, " Approaches and Methods in Language Teaching, Second Edition, Cambridge University Press

Subject Code	Subject Name	Category	L	T	P	C
HS 23223	English for Professional Competence Common to all branches of B.E/B. Tech programmes –Second Semester	HS	0	0	2	1

Objectives:	
☐	To facilitate the learners in acquiring listening and reading competence
☐	To enable the learners to communicate effectively through written and oral medium
☐	To assist the learners in preparing for competitive examinations
☐	To train the students in acquiring corporate skills
☐	To inculcate professional standards among the students and make them realize their responsibility in addressing the challenges

UNIT-I	RECEPTIVE SKILLS	6
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Listening – Comprehensive Listening – Watching the news – Listening to a peer giving presentation, etc. – Critical Listening – Watching a televised debate, Listening to poems – **Reading** – Extensive Reading – Short stories and One-act Plays – Intensive Reading – Articles or Editorials in Magazines, Blog posts on topics like science and technology, arts, etc.

UNIT-II	PRODUCTIVE SKILLS	6
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Speaking – Demonstrative Speaking – Process description through visual aids – Persuasive Speaking – Convincing the listener with the speaker’s view – **Writing** – Descriptive Writing - Describing a place, person, process – Subjective Writing – Autobiography, Writing based on personal opinions and interpretations

UNIT-III	ENGLISH FOR COMPETITIVE EXAMS	6
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An introduction to International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Graduate Record Examination (GRE) – Civil Service, Indian Economic Service Examination, Indian Statistical Service Examination, Combined Defence Services Examination, Staff Selection- (Language Related) – Aptitude tests.

UNIT-IV	CORPORATE SKILLS	6
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Critical Thinking and Problem Solving – Case Study, Brainstorming, Q & A Discussion – **Team work and Collaboration** – Activities like Office Debates, Perfect Square, Blind Retriever, etc. – **Professionalism and Strong Work Ethics** – Integrity, Resilience, Accountability, Adaptability, Growth Mind set

UNIT-V	PROJECT WORK	6
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Case Study based on the challenges faced by the employers and the employees – Devise Plan, Provide Solution

Total Contact Hours		30
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Course Outcomes:	
On completion of the course, students will be able to	
•	interpret and respond appropriately in the listening and reading contexts.
•	express themselves effectively in spoken and written communication
•	apply their acquired language skills in writing the competitive examinations
•	exhibit their professional skills in their work place
•	identify the challenges in the work place and suggest strategies solutions

SUGGESTED ACTIVITIES

Online Quizzes on Vocabulary
Online Quizzes on grammar
Communication Gap Exercises
Presentations
Word Building Games
Case study

SUGGESTED EVALUATION METHODS

Assignment topics
Quizzes
Class Presentation/Discussion
Continuous Assessment Tests

Reference Books

1	How to Read Better & Faster, Norman Lewis, Goyal Publishers
2	Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine Chuen Meng Goh, Cambridge University Press
3	The Official Cambridge Guide To IELTS by Pauline Cullen, Cambridge University Press
4	The 7 Habits of Highly Effective People by Stephen Covey, Simon and Schuster, UK

Reference Books(s) / Web links:

1.	Board of Editors. Sure Outcomes. A Communication Skills Course for Undergraduate Engineers and Technologists. Orient Black Swan Limited, Hyderabad, 2013.
2.	Hartley, Mary. "The Power of Listening," JaicoPublishing House; First Edition (2015).
3.	Chambers, Harry. "Effective Communication Skills for Scientific and Technical Professionals," Persues Publishing, Cambridge, Massachusetts, 2000.

Subject Code	Subject Name (Laboratory Course)	Category	L	T	P	C
GE23121	ENGINEERING PRACTICES – Civil and Mechanical	ES	0	0	2	1

Objectives:

To provide exposure to the students with hands on experience on various basic engineering practices in Civil and Mechanical Engineering.

List of Experiments							
CIVIL ENGINEERING PRACTICE							
1.	Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, and elbows in household fittings.						
2.	Preparation of basic plumbing line sketches for wash basins, water heaters, etc.						
3.	Hands-on-exercise: Basic pipe connections – Pipe connections with different joining components.						
Carpentry Works:							
4.	Study of joints in roofs, doors, windows and furniture.						
5.	Hands-on-exercise: Woodwork, joints by sawing, planning and chiselling.						
MECHANICAL ENGINEERING PRACTICE							
6.	Preparation of butt joints, lap joints and T- joints by Shielded metal arc welding.						
7.	Gas welding practice.						
Basic Machining:							
8.	Simple Turning and Taper turning						
9.	Drilling Practice						
Sheet Metal Work:							
10.	Forming & Bending:						
11.	Model making – Trays and funnels						
12.	Different type of joints.						
Machine Assembly Practice:							
13.	Study of centrifugal pump						
14.	Study of air conditioner						
					Total Contact Hours	:	30

Course Outcomes:

<input type="checkbox"/>	Able to perform plumbing activities for residential and industrial buildings considering safety aspects while gaining clear understanding on pipeline location and functions of joints like valves, taps, couplings, unions, reducers, elbows, etc.
<input type="checkbox"/>	Able to perform wood working carpentry activities like sawing, planning, cutting, etc. while having clear understanding of the joints in roofs, doors, windows and furniture.
<input type="checkbox"/>	Able to produce joints like L joint, T joint, Lap joint, Butt joint, etc. through arc welding process while acquiring in depth knowledge in the principle of operation of welding and other accessories
<input type="checkbox"/>	Able to perform operations like Turning, Step turning, Taper turning, etc. in lathe and Drilling operation in drilling machine
<input type="checkbox"/>	Able to perform sheet metal operations like Forming, Bending, etc. and fabricating models like Trays, funnels, etc.

TOTAL: 30 PERIODS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	1	1	-	-	2	1	-	2	-	-	2	-	2	1
CO 2	1	1	1	-	-	2	1	-	2	-	-	2	-	2	1
CO 3	1	1	1	-	-	2	1	-	2	-	-	2	-	2	1
CO 4	1	1	1	-	-	2	1	-	2	-	-	2	-	2	1
CO 5	1	1	1	-	-	2	1	-	2	-	-	2	-	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Subject Code	Subject Name (Theory course)	Category	L	T	P	C
MC23112	ENVIRONMENTAL SCIENCE AND ENGINEERING Common to all branches of B.E./B.Tech. courses (Except B.Tech- CSBS)	MC	3	0	0	0

Objectives:	
	<p>To develop the understanding of environmental and associated issues</p> <p>To develop an attitude of concern for the environment</p> <p>To promote enthusiasm in participating environmental protection initiatives</p> <p>To nurture skills to solve environmental degradation issues</p>

UNIT-I	Air and Noise pollution	9
<p>Definition –sources of air pollution –chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, ozone depletion, particulate pollutants-Air quality standards-Air quality indices - control of particulate air pollutants-gravitational settling chambers, cyclone separators, wet collectors, fabric filters (Bag-house filter), electrostatic precipitators (ESP)-catalytic converters.</p> <p>Noise pollution –sources - health effects - standards- measurement and control methods.</p>		
UNIT-II	Water pollution and its management	9
<p>Definition-causes-effects of water pollution-point and nonpoint sources of wastewater-marine pollution - thermal pollution - Control of water pollution by physical, chemical and biological methods – wastewater treatment-primary, secondary and tertiary treatment-sources and characteristics of industrial effluents- zero liquid discharge.</p>		
UNIT-III	Solid waste and Hazardous waste management	9
<p>Solid waste – types- municipal solid waste management: sources, characteristics, collection, and transportation-sanitary landfill, recycling, composting, incineration, energy recovery options from waste - Hazardous waste – types, characteristics, and health impact - hazardous waste management: neutralization, oxidation reduction, precipitation, solidification, stabilization, incineration and final disposal. E-waste-definition-sources-effects on human health and environment- E-waste management- steps involved - Role of E-waste management within the initiatives of the Govt. of India- Swachh Bharat Mission.</p>		
UNIT-IV	Sustainable Development	9
<p>Sustainable development- concept-dimensions-sustainable development goals - value education- gender equality – food security - poverty – hunger - famine - Twelve principles of green chemistry - Green technology - definition, importance - Cleaner development mechanism - carbon credits, carbon trading, carbon sequestration, eco labeling- International conventions and protocols-Disaster management.</p>		
UNIT-V	Environmental Management and Legislation	9
<p>Environmental Management systems - ISO 14000 series- Environmental audit-Environmental Impact Assessment- life cycle assessment- human health risk assessment - Environmental Laws and Policy- Objectives - Polluter pays principle, Precautionary principle - The Environment (Protection) Act 1986 - Role of Information technology in environment and human health.</p>		
Total Contact Hours		: 45

Course Outcomes:	
On completion of the course, the students will be able to	
CO1	Associate air and noise quality standards with environment and human health.
CO2	Illustrate the significance of water and devise control measures for water pollution.
CO3	Analyze solid wastes and hazardous wastes.
CO4	Outline the goals of sustainable development in an integrated perspective.
CO5	Comprehend the significance of environmental laws.

Text Books:	
1	Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016
2	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
3	Johri R., E-waste: implications, regulations, and management in India and current global best practices, TERI Press, New Delhi

Reference Books	
1	R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38. Edition 2010.
2	Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3	Fowler B, Electronic Waste – 1 st Edition (Toxicology and Public Health Issues), 2017Elsevier

CO - PO – PSO matrices of course

PO/PSO CO	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3
MC23112.1	1	2	3	1	-	2	2	2	1	1	1	2			
MC23112.2	1	2	3	1	-	2	2	2	1	1	1	2			
MC23112.3	-	-	3	1	-	2	3	2	1	-	1	2			
MC23112.4	-	1	2	1	1	3	3	2	1	1	1	2			
MC23112.5	-	1	2	-	-	2	2	2	1	2	2	2			
AVG.	0 4	1 2	2 6	0 8	0 2	2 2	2 4	2	1	1	1. 2	2			

Note: Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Web links:	
1	https://onlinecourses.nptel.ac.in/noc19_ge22/
2	NPTEL
3	https://news.mit.edu/2013/ewaste-mit

Suggested activities

1. Case studies presentation

Method of evaluation

1. Classroom presentations on case studies (or) Site visits, instead of CAT-I (or)CAT-II or CAT III